Amendments to the Claims

The following listing of claims replaces all prior listings of claims in the application:

1. (Currently amended) A method for ~~preparing~~ coating a biochip carrier ~~(biochip) coated~~ with biologically or chemically functional materials, which comprises ~~the steps of~~:

(a) providing a carrier having a surface which ~~has~~ comprises photoactivatable groups located on predetermined areas of said carrier surface;

(b) activating ~~the~~ said photoactivatable groups on at least a predetermined area of said carrier surface by monitored and controlled location-specific ~~exposure~~ illumination of ~~the~~ said predetermined area of said carrier surface using an illumination matrix ~~which can be controlled~~ to generate an ~~optionally~~ adjustable ~~exposure~~ illumination pattern~~, the exposure of the carrier being monitored and, where appropriate~~ which is controlled by means of a light sensor matrix, ~~in particular a CCD matrix,~~;

(c) ~~location-specific~~ binding ~~of~~ said biologically or chemically functional materials or building blocks for ~~such~~ said materials on ~~at least one of the~~ said predetermined ~~areas~~ area of said carrier surface; and

(d) ~~where appropriate,~~ repeating the ~~activation~~ activating and binding steps on the same ~~or/and~~ or a different predetermined area of said carrier surface.

2. (Currently amended) The method ~~as claimed in~~ of claim 1, ~~characterized in that~~ wherein said illumination is with electromagnetic radiation selected from the group consisting of ~~in the~~ infrared ~~range~~, visible ~~range~~, ultraviolet ~~range~~ and X-ray

~~range is used for the exposure~~ radiation.

3. (Currently amended) The method ~~as claimed in~~ of claim 1 ~~or 2~~, ~~characterized in that the~~ wherein said carrier is ~~exposed to~~ illuminated with radiation selected from the group consisting of pulsating radiation, coherent radiation, monochromatic radiation, parallel radiation ~~or/and to~~ and radiation which can be focused in different planes.

4. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that~~ wherein different predetermined areas are ~~exposed~~ illuminated in parallel.

5. (Currently amended) The method ~~as claimed in any~~ of ~~claims 1 to 4~~ claim 1, ~~characterized in that the~~ wherein said illumination matrix ~~used~~ is a reflection matrix having a controllably deformable mirror arrangement ~~deformable in a controlled way~~.

6. (Currently amended) The method ~~as claimed in any~~ of ~~claims 1 to 4~~ claim 1, ~~characterized in that the~~ wherein said reflection matrix ~~used~~ is selected from the group consisting of a light modulator with viscoelastic control layers ~~or~~ and a light modulator with micromechanical mirror arrays.

7. (Currently amended) The method ~~as claimed in any~~ of ~~claims 1 to 4~~ claim 1, ~~characterized in that the~~ wherein said illumination matrix ~~used is a matrix arrangement which~~ is prepared on a chip and ~~which is composed of~~ comprises a light ~~sources, namely~~ source selected from the group consisting of a laser array ~~or/and~~ and a diode array.

8. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that,~~ wherein said biochip carrier is an optically transparent carrier ~~is used~~.

9. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that, the~~ wherein said biochip carrier has a surface selected from ~~semiconducting materials, for example silicon, germanium or gallium arsenide,~~ the group consisting of glass~~, for example quartz glass,~~ and plastics.

10. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that the~~ wherein said predetermined ~~activated areas include an~~ area ~~of~~ is from 1 μm^2 to 1 cm^2~~, in particular 100 μm^2 to 1 mm^2~~.

11. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that the~~ wherein said predetermined ~~activatable areas are~~ area is surrounded by nonactivated ~~or/and~~ or nonactivatable areas.

12. (Canceled herein).

13. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that the~~ wherein said biologically or chemically functional materials ~~are selected from biological substances or materials reacting~~ react with biological substances.

14. (Currently amended) The method ~~as claimed in any~~ of ~~the~~

~~preceding claims~~ claim 1, ~~characterized in that the~~ wherein said biologically or chemically functional materials are selected from the group consisting of nucleic acids ~~and nucleic acid building blocks~~, ~~in particular~~ nucleotides, ~~and~~ oligonucleotides, nucleic acid analogs, ~~such as~~ PNA ~~and building blocks thereof~~, peptides, ~~and~~ proteins ~~and building blocks thereof~~, ~~in particular~~ amino acids, saccharides, cells, ~~subcellular preparations such as~~ cell organelles, ~~or~~ cell membrane preparations, viral particles, cell aggregates, allergens, pathogens, pharmacological active substances and diagnostic reagents.

15. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that the~~ wherein said biologically or chemically functional materials are synthesized on ~~the~~ said carrier in two or more stages from monomeric ~~or/and~~ or oligomeric building blocks.

16. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that~~ wherein said biologically or chemically functional materials are a ~~substance~~ library comprising a multiplicity of different biologically or chemically functional materials ~~is generated on the carrier~~.

17. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that activation of predetermined areas~~ wherein said activating photoactivatable groups comprises cleaving a protective group ~~off the~~ on said at least a predetermined area of said carrier ~~itself or off materials or building blocks thereof which are bound on said carrier~~ surface.

18. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that the exposure~~ wherein said illumination takes place at a rate of from 1/10000 to 1000~~, preferably 1/10 to 100~~ light patterns per second.

19. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that the~~ wherein said illumination matrix, carrier and light sensor matrix form a ~~transmitted-light arrangement~~ light source matrix.

20. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that the~~ wherein said illumination matrix, carrier and light sensor matrix form a ~~reflected-light arrangement~~ reflected light matrix.

21. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, ~~characterized in that the~~ wherein said carrier is precalibrated using the illumination matrix and light sensor matrix.

22. (Currently amended) The method ~~as claimed in any~~ of ~~the preceding claims~~ claim 1, which ~~furthermore~~ further comprises ~~removing,~~ at least partially~~,~~ removing materials ~~synthesized~~ bound on the carrier~~, in particular polymers such as nucleic acids, nucleic acid analogs and proteins~~.

23. (Currently amended) The method ~~as claimed in~~ of claim 22, ~~characterized in that the~~ wherein said materials ~~in different areas~~ bound on the carrier are removed in successive steps and used as building blocks for further synthesis of polymers~~, in~~

~~particular nucleic acid polymers~~.

24-26. (Canceled herein).

27. (Currently amended) A method for ~~preparing~~ coating a biochip carrier ~~(biochip) coated~~ with biologically or chemically functional materials, which comprises ~~the steps of~~:

(a) providing a carrier having a surface which ~~has~~ comprises photoactivatable groups~~,~~ located on predetermined areas of said carrier surface;

(b) activating ~~the~~ said photoactivatable groups ~~on at least one predetermined area of the carrier surface~~ by location-specific exposure of ~~the carrier using~~ said photoactivatable groups to a UV source selected from the group consisting of a diode array~~,~~ ~~or/and~~ a UV laser array, ~~which can be~~ and both a diode array and a UV laser array, wherein said UV source is controlled to generate an ~~optionally~~ adjustable exposure pattern~~,~~;

(c) ~~location-specific~~ binding ~~of~~ said biologically or chemically functional materials or building blocks for ~~such~~ said materials on ~~at least one of the~~ said predetermined areas of said carrier surface; and

(d) ~~where appropriate,~~ repeating the ~~activation~~ activating and binding steps on the same ~~or/and~~ or different predetermined areas of said carrier surface.

28. (New) The method of claim 27, wherein said location-specific exposure is controlled by means of a light sensor matrix.

29. (New) The method of claim 28, wherein said light sensor

matrix is a CCD matrix.

30. (New) The method of claim 27, wherein said carrier is illuminated with radiation selected from the group consisting of pulsating radiation, coherent radiation, monochromatic radiation, parallel radiation and radiation which can be focused in different planes.

31. (New) The method of claim 27, wherein different predetermined areas are illuminated in parallel.

32. (New) The method of claim 27, wherein said biochip carrier is an optically transparent carrier.

33. (New) The method of claim 32, wherein said biochip carrier has a surface selected from the group consisting of glass and plastics.

34. (New) The method of claim 27, wherein said predetermined areas are from 1 μm^2 to 1 cm^2.

35. (New) The method of claim 34, wherein said predetermined areas are from 100 μm^2 to 1 mm^2.

36. (New) The method of claim 27, wherein said predetermined areas are surrounded by nonactivated or nonactivatable areas.

37. (New) The method of claim 27, wherein said biologically or chemically functional materials react with biological substances.

38. (New) The method of claim 27, wherein said biologically or chemically functional materials are selected from the group consisting of nucleic acids, nucleotides, oligonucleotides, nucleic acid analogs, PNA, peptides, proteins, amino acids, saccharides, cells, cell organelles, cell membrane preparations, viral particles, cell aggregates, allergens, pathogens, pharmacological active substances and diagnostic reagents.

39. (New) The method of claim 27, wherein said biologically or chemically functional materials are synthesized on said carrier in two or more stages from monomeric or oligomeric building blocks.

40. (New) The method of claim 27, wherein said biologically or chemically functional materials are a library comprising a multiplicity of different biologically or chemically functional materials.

41. (New) The method of claim 27, wherein said activating photoactivatable groups comprises cleaving a protective group on said predetermined areas of said carrier surface.

42. (New) The method of claim 27, wherein said illumination takes place at a rate of from 1/10000 to 1000 light patterns per second.

43. (New) The method of claim 42, wherein said illumination takes place at a rate of from 1/10 to 100 light patterns per second.

44. (New) The method of claim 27, which further comprises at least partially removing materials bound on the carrier.

45. (New) The method of claim 44, wherein said materials bound on the carrier are removed in successive steps and used as building blocks for further synthesis of polymers.

46. (New) The method of claim 1, wherein said light sensor matrix is a CCD matrix.

47. (New) The method of claim 9, wherein said semiconducting material is selected from the group consisting of silicon, germanium arsenide and gallium arsenide.

48. (New) The method of claim 9, wherein said glass is quartz glass.

49. (New) The method of claim 10, wherein said predetermined area is from 100 μm^2 to 1 mm^2.

50. (New) The method of claim 18, wherein said illumination takes place at a rate of from 1/10 to 100 light patterns per second.

51. (New) The method of claim 22, wherein said materials bound on the carrier are selected from the group consisting of nucleic acids, nucleic acid analogs and proteins.

52. (New) The method of claim 23, wherein said polymers are nucleic acid polymers.

53. (New) The method of claim 24, wherein said controllable illumination matrix is a reflection matrix.

54. (New) The method of claim 25 wherein said smears are selected from the group consisting of cell smears and microbead smears.

55. (New) The method of claim 25, wherein said biological samples are selected from the group consisting of tissue sections and cell arrays.

56. (New) A method for coating a biochip carrier with biologically or chemically functional materials, which comprises:

(a) providing a carrier having a surface which comprises photoactivatable groups located on predetermined areas of said carrier surface;

(b) activating said photoactivatable groups by monitored and controlled location-specific exposure of said photoactivatable groups to a UV source selected from the group consisting of a diode array, a UV laser array, and both a diode array and a UV laser array, wherein said UV source is controlled to generate an adjustable exposure pattern by means of a light sensor matrix;

(c) binding said biologically or chemically functional materials or building blocks for said materials on said predetermined areas of said carrier surface; and

(d) repeating the activating and binding steps on the same or different predetermined areas of said carrier surface.